

MEMORANDUM

DATE: June 2, 2020

TO: MEMBERS, State Board of Education

FROM: TONY THURMOND, State Superintendent of Public Instruction

SUBJECT: Update on the Implementation of the Integrated Local, State, and Federal Accountability and Continuous Improvement System: Chronicle Review of the Work Completed on the Student-Growth Model and a Progress Report on Ongoing Work.

Summary of Key Issues

At the July 2018 meeting, the State Board of Education (SBE) directed the California Department of Education (CDE) to conduct further study on a measure of individual student growth, including the impact of future years of assessment data, changes in the model to reduce year-to-year volatility, consideration of additional growth models or options, and an examination of growth models implemented in other states. (<https://www.cde.ca.gov/be/ag/ag/yr18/documents/jul18item01.docx>).

The CDE engaged the California Comprehensive Center (CCC) to conduct this research and to facilitate a stakeholder process on the future direction of this work. The CCC contracted with the National Center for Improvement of Education Assessment for Joseph Martineau to facilitate the discussion with the stakeholder group. Based on the feedback gathered from the stakeholder engagement process, the CDE has moved forward with a regression-based individual student-level growth model and is engaging the Educational Testing Service (ETS) to explore how this model can be best implemented. This Information Memorandum chronicles the work (from 2015 to the present) to identify an appropriate model to measure student growth; highlights some of the decision milestones that have been reached along the way; and charts the tasks ahead for the CDE, the ETS, and the Student Growth Stakeholder Group to advance this work.

Attachment(s)

Attachment 1: Review of the Work Completed on the Student-Growth Model and a Progress Report on Ongoing Work (8 pages).

Attachment 1

Summary of Work on Student Growth from 2015-Present

Initial Work on Student Growth within a New Accountability System

The initial work on student growth within the accountability context began in 2015 and coincided with the development of a new accountability system for the state of California. Data from the 2014 scientific sample of the California Assessment of Student Performance and Progress (CAASPP) field test and the initial year of 2015 CAASPP results were used to conduct various growth model simulations in late 2015. Initial findings were presented to the California Department of Education (CDE) Technical Design Group (TDG).

Discussions of a new state accountability system, based on the Local Control Funding Formula (LCFF) state priorities, with the newly enacted federal Every Student Succeeds Act (ESSA) accountability requirements, began at the January 2016 State Board of Education (SBE) meeting. The CDE informed both the SBE and SBE staff on various options for a student-level growth model. In February 2016, the SBE received its first Information Memorandum on student-level growth models that could be used to communicate Smarter Balanced Summative Assessment results (<https://www.cde.ca.gov/be/pn/im/documents/memo-dsib-amard-feb16item01.doc>).

SBE members requested additional information on student-level growth models at their May 2016 meeting; specifically, they requested an explanation on how these models would fit into the proposed accountability system. CDE responded to these questions in a June 2016 Information Memorandum, focusing in particular on the differences between student-level reporting and school- and district-level accountability reporting (<https://www.cde.ca.gov/be/pn/im/documents/memo-dsib-amard-jun16item01.doc>). The memorandum addressed some confusion that existed around possible report venues, and clarified that student reports generally use simple gain scores that are easy to communicate, while accountability systems traditionally use more complex growth models to obtain greater validity and reliability. In Fall 2016, when the second year of CAASPP data was released (and which marked the first opportunity to examine growth data for the majority of students in the state) CDE worked with the TDG and Educational Testing Services (ETS) to examine the growth data.

2017: Exploring Growth Model Options

In January 2017, the SBE discussed the specific criteria for selecting a growth model for school and district accountability (<https://www.cde.ca.gov/be/ag/ag/yr17/documents/jan17item02.doc>):

- 1. Conform to rigorous technical standards.**

The growth model should measure academic progress over time for schools, local educational agencies (LEAs), and the state. It should produce precise information that is valid for its purpose. The model should have the capacity to produce reliable results

for student groups as small as 30.

2. Be capable of being included in accountability systems.

The growth model should fit into a multiple measures approach for examining state and district academic progress over time, as envisioned in the SBE approved accountability system. Additionally, the information should be useful to LEAs in establishing local goals and evaluating local programs (e.g., Local Control and Accountability Plans).

3. Provide a measure of academic growth across the continuum of performance.

The growth model should allow for progress to be measured across the continuum of academic achievement. The model should have the capacity to evaluate academic achievement gaps between students' groups in such a way as to make determinations about the narrowing of those gaps. The information on which the growth model is based should be consistent from year to year and reflect how students performed in terms of where they started in the previous year.

4. Provide for the inclusion of all students.

The growth model should be applied to all students who earn a valid score on the ELA/literacy and mathematics statewide assessments. The information used to produce the growth model should be based only on student test scores and not on any other school or student characteristics.

5. Provide information on academic progress that is easily communicated to educators and the public.

Information from the growth model, at the school-, LEA-, and state-level, should be displayed in a manner that stakeholder groups can easily understand.

Following the SBE meeting, the CDE consulted with the ETS, the TDG, the CAASPP Technical Advisory Group (TAG), the California Practitioners Advisory Group (CPAG), and the Statewide Assessment Stakeholder Group, and various stakeholders regarding potential growth models. Table 1 lists the ten growth models that were explored during these meetings and the central question that each model attempts to answer. The individual student growth models fit into one of three general categories: Absolute Growth, Relative Growth, and Projected Growth.

Table 1. Growth Models Considered for Simulation Studies

General Category	Type of Growth Model	Central Question
Absolute Growth*	1. Gain Score	How much did a student's performance change from last year?
Absolute Growth*	2. Average Gain	How much did a student's performance change (on average) over multiple years?
Absolute Growth*	3. Categorical Model	How has a student progressed towards a desired performance level?
Relative Growth**	4. Residual Gain Model	How much higher/ lower did a student score this year than expected, given past performance?
Relative Growth**	5. Conditional Percentile Ranks of Gains	How does a student's gain this year compared to that of other students who started at the same place last year?
Relative Growth**	6. Student Growth Percentile Model: (SGPs)	How does a student's current performance compare to that of other students with the same prior test scores?
Projected Growth***	7. Trajectory Model	What is the minimum gain score a student must maintain to reach a target future standard?
Projected Growth***	8. Projection Model	Where is a student likely to score in the future, given the student's score history?
Projected Growth***	9. The SGP Model: Projections	What is the minimum SGP a student must maintain to reach a target future standard?
Projected Growth***	10. Probability Model	What is the probability that a student will reach a desired benchmark in a future grade level?

*Background green for absolute growth

**Background blue for relative growth

***Background orange for projected growth

At the March 2017 SBE Meeting, CDE notified the SBE that it would take twelve to eighteen months to complete work on a student-level growth model, and that it would not be ready for accountability purposes until the 2018 Dashboard (<http://www.cde.ca.gov/be/ag/ag/yr17/documents/mar17item02.doc>).

Based on the criteria set by the SBE at its January 2017 meeting and on the feedback received from its stakeholder groups, the CDE narrowed the field of potential growth models from ten to three options. It presented these three options to the SBE at the July 2017 meeting, (<https://www.cde.ca.gov/be/pn/im/documents/memo-asb-adad-jun17item03.doc>):

- **Change-in-Distance-to-Met (CDTM):** Measures absolute growth of each student from the prior year to the current year using Distance from Level 3 as the measurement threshold.
- **Conditional Percentile Rank of the Gain (CPR):** Ranks the growth of students who are grouped together as a result of having the same prior year test scores, in the same subject and grade.
- **Residual Gain (RG):** The difference between a student's predicted test score and actual test score. Note: the predicted score is based on prior ELA and mathematics test scores, as well as on the scores of all other students in the same grade.

Following the July 2017 SBE meeting, CDE directed ETS to complete a statistical analysis of all three proposed growth models, using growth data calculated from the 2015 and 2016 administrations of the CAASPP. The research question(s) for each model included within- and across-model investigation, exploring how aggregate scores differed among student groups and school composition.

2018: Finding the Best Fit for Student Growth in California

Technical work on the student growth analysis was completed by ETS in early 2018, and the results of this study were formalized and published in an SBE Information Memorandum in February 2018 (<https://www.cde.ca.gov/be/pn/im/documents/memo-pptb-amard-feb18item01.docx>). Additionally, ETS and CDE presented this analysis to the CAASPP Technical Advisory Group, the TDG, and CPAG, as well as to LCFF and assessment stakeholders for feedback.

The Student Growth Model was formally introduced at the March 2018 SBE Meeting, as part of the CDE's presentation on the 2018 Dashboard workplan (<https://www.cde.ca.gov/be/ag/ag/yr18/documents/mar18item01.docx>). At that time, it was anticipated that, at its May 2018 meeting, the SBE would select one of three growth models for possible inclusion in the 2018 Dashboard, and that it would formally adopt the model at its September 2018 meeting. The SBE reviewed the growth models at its May 2018 meeting and directed the CDE to conduct additional analyses on the RG model, using data from the spring 2017 CAASPP administration (<https://www.cde.ca.gov/be/ag/ag/yr18/documents/may18item02.docx>). Specifically, the CDE was asked to address two questions:

1. What information does the RG model provide compared to the information that the current District from Standard (DFS) provides?
2. How would the RG model fit into the current accountability five-by-five structure?

The CDE shared its analyses with the SBE in a June 2018 Information Memorandum. The memorandum also included the findings from the second stage of the ETS study on growth models for California. The memorandum pointed out that the RG model provides information on the number of students who met their predicted test scores, as well as the variance between their actual and predicted test scores; however, the model does not provide the amount of improvement needed to bring the average student up to the Standard Met Level (Level 3) on the Smarter Balanced Assessment, whether achievement gaps are closing, or if students were on track to reach proficiency. Additionally, the memorandum pointed out that replacing change with growth in the current five-by-five structure, which is based on continuous improvement, could result in conflicting or confusing messages to the public; for example, under the RG model, a school could decrease in Status while experiencing positive Growth, and vice-versa.

The ETS Report, entitled “Updated Analysis of the Residual Gain Model 2017–18 Plan,” was based on three years of CAASPP data (2015, 2016, 2017) and two growth measurements (2015 to 2016 and 2016 to 2017). The analysis showed that, while the RG model performed statistically similar in both years, there was low year-to-year stability within the outcomes. “Such high volatility can make it difficult for local educational agencies to use the growth data for driving decisions, as decisions made one year might be contradicted with the next year’s growth data. It may be more advisable to look for patterns in these scores over several years than to act on their values in a given year” (<https://www.cde.ca.gov/be/pn/im/documents/memo-pptb-amard-jun18item01a1.docx>).

Therefore, at the July 2018 meeting, the SBE directed the CDE to conduct further analyses on the RG model and paused the incorporation of any student-level growth model in the 2018 Dashboard. The SBE wanted to see the impact of future years of assessment data on the model, what changes could be made to reduce year-to-year volatility, if there were a consideration of additional growth models or options, and how growth models had been successfully implemented in other states. Additionally, the SBE requested that the CDE convene a stakeholder group to discuss what additional information was wanted from an individual student growth model that was not already available in current testing data (<https://www.cde.ca.gov/be/ag/ag/yr18/documents/jul18item01.docx>).

2019: Stakeholder Engagement on the Growth Model

In response to the SBE's request, the CDE engaged the California Comprehensive Center (CCC) to convene a stakeholders workgroup to advance the work of the growth model (<https://www.cde.ca.gov/be/pn/im/documents/nov19memoamard01.docx>). Nineteen participants were gathered from a cross-section of researchers, educators, and staff from educational and equity advocacy groups who had been actively contributing to the broader discussion of growth models. The CCC organized four in-person meetings to gather a deeper understanding of what a growth model could provide California. A summary of the meeting dates and topics is shared below in Table 2.

Table 2: The 2019 Stakeholder Meetings

Meetings	Date (2019)	Attendance *	Purpose
Meeting #1	February 4	14	Set common understanding of CA accountability system, growth model work to date, Smarter Balanced scale, and terms/language/definitions
"Catch-up" Virtual Meeting	March 11	5	On March 11, the CA CC hosted a virtual meeting, presenting the same content as the February 4 meeting. All five stakeholder representatives who did not attend the February 4 meeting attended this "catch-up" meeting.
Meeting #2	April 10	17	Explore, analyze, and prioritize potential "interpretations" (i.e., data questions that can be answered by various growth models)
Meeting #3	May 29	14	Review selected states' growth models, review various analytical models, and discuss broad interpretations
Conversations Kit Orientation	July 8–9	8	On July 8 and 9, the CA CC hosted an optional virtual meeting to orient stakeholder representatives to the tools in the Conversations Kit.
Meeting #4	September 23	15	Review results from the survey about community conversations, discuss most important actions and behaviors

*Attendance counts reflect only stakeholder representatives. Presenters, observers, and staff of the CDE, SBE, and CA CC also attended and are not included in the attendance counts.

The meetings provided insight into how deeply valued the idea of student growth is within California yet how difficult it is to create a growth measure that covers the wide variety of information various people hope a growth model can provide. Reflecting on the insights gleaned from the collective meetings, the CDE concluded that the RG model best fit the expectations and wants expressed by the group. It then set its attention on addressing the concerns voiced by the SBE at its July 2018, specifically, the year-to-year volatility of the scores.

2020: Releasing Student Growth Data

Beginning in February 2020, the CDE reengaged the TDG on this work and specifically, how technical modifications could improve the results of the RG model within an accountability framework. From this discussion the CDE considered two options:

- Changing the Highest Obtainable Scale Score (HOSS)/Lowest Obtainable Scale Score (LOSS) on the CAASPP, which would result in allowing more students to show gains at the higher thresholds, and
- Implementing new regression formulas to counter small n-size and stability issues.

In March 2020, the CDE included in its 2020 Accountability Work Plan, the release of a student-level growth model in December 2020. With this timeline in place, CDE began meeting with ETS to discuss further analyses of California's growth data. In April 2020, ETS presented the Estimated Best Linear Prediction (EBLP) model to the TDG. Following the meeting, ETS and CDE agreed to analyze the latest year of growth data using the RG methodology but to also conduct a new analysis of growth using the EBLP methodology.

ETS will share the results of these analyses with the TDG and the CPAG in August 2020. At that time, either the CDE will either accept the results as they are or request (per TDG and CPAG guidance), additional model constraints. A summary of the impact of the EBLP methodology on stability will be shared at the September 2020 SBE Meeting.

At the March 2020 meeting, the SBE directed the CDE to provide a presentation for the May 2020 meeting regarding the work conducted to date on the development of a student-level growth model. However, due to the COVID crises and shift in activities for accountability, the CDE postponed the presentation until the July 2020 SBE meeting (<https://www.cde.ca.gov/be/ag/ag/yr20/documents/mar20item05.docx>).

2020 Timeline for the Development of a Measure of Individual Student Growth

This table provides a calendar and timeline of the key activities related to the ongoing development and implementation of a measure of individual student growth for release in December 2020. Note: the timing of these activities may be subject to change.

Date	Activity
February 2020	Discussion with TDG on technical modifications (HOSS/LOSS and EBLP) to RG model
March 2020	SBE Meeting: Update on the 2020 Dashboard work plan
April 2020	Presentation to the TDG on EBLP modeling and initial technical requirements
April/May 2020	Discussions with ETS on EBLP and regression modeling parameters
June 2020	SBE Information Memorandum on the Chronicle Review of the work completed on the student growth model, and presentation of workplan and EBLP modeling to Student Growth Stakeholder Group
July 10-11, 2020	SBE Meeting: Item on Measure of Individual Student Growth
July 2020	ETS to deliver a technical report to CDE on EBLP and 2018–19 Regression Modeling
August 2020	ETS to present a report to TDG –Discuss any additional technical adjustments and the CDE to present the EBLP methodology to the CPAG
August-September 2020	ETS conducts additional technical work on Growth Model by ETS, as requested by TDG
September 2020	SBE Meeting: Present preliminary results of the EBLP methodology as compared to the prior RG Model and SBE to provide CDE with direction on which model to pursue
October 2020	Discussion of final ETS report with TDG and provide SBE with a report in an Information Memorandum
November 2020	SBE Meeting: Approval of Model to Measure Individual Student Growth
December 2020	Public Release of Growth Model Data (LEA/School/Student Group level) on the CDE California School Dashboard and System of Support webpage